C. Co-Channel Separation Between Wideband Pulse-Ranging Systems Should Be Required

As pointed out in our Opening Comments at 13, co-channel separation is a necessity for wideband pulse-ranging systems if they are to operate accurately and efficiently. Sharing regimes would seriously degrade LMS service and impose substantial costs without any public benefit. That conclusion was supported by substantial independent technical and economic analysis submitted with these comments. The comments show a strong consensus of opinion on this issue. Only Pinpoint takes the position that, as a wideband operator, it will be able to share spectrum with other wideband operators.[22] However, even Pinpoint's extreme position has shifted over time as it has been forced to come to grips with the inherent realities of co-channel interference. Indeed, it is fair to say that a careful reading of Pinpoint's various pleadings will demonstrate that Pinpoint has conceded many of the principles articulated in Teletrac's Petition.

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[22] MobileVision and Southwestern Bell have explicitly taken the position that co-channel separation is necessary for the accurate and efficient operation of LMS systems. MobileVision Comments at 16-26; Southwestern Bell Comments at 12, 16, 21-22.

1. Pinpoint's Criticisms of Teletrac's Proposal are Unfounded, and it has Moved Away from its Open Sharing Proposals

Pinpoint has abandoned its previous position that the Commission should adopt an "open entry" LMS policy.[23] Pinpoint now advocates a system of limited entry, those potential entrants being limited to a one-day filing window, substantial financial qualifications and detailed technical showings.[24] The survivors of that process would then, under Pinpoint's vague proposal, sit down and negotiate some sort of time-sharing arrangement. (Pinpoint Comments at 35-36). This may be a time-consuming and physically difficult process if the Commission receives numerous license applications in each market, as it has in other services. Should negotiations fail, Pinpoint falls back to a mandatory time-sharing arrangement based on equal time slots and some third party to administer the time-sharing. (Id. at 37).

Pinpoint is unable to state how any scheme would permit sharing among the dozens or hundreds of applicants, what the consequences on capacity and service would be under its sharing scenario or for that matter, what technical assumption suggests

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[23] Opposition of Pinpoint Communications, July 23, 1992 at 26.

[24] Pinpoint Comments at 35-39. For example, Pinpoint claims an applicant must use "demonstrably proven technology." Id. at 38. But, if that is so, it is hard to see how Pinpoint would qualify since, to our knowledge, it does not have demonstrably proven technology. On the other hand, if Pinpoint qualifies, then the term means little and literally thousands of applicants could qualify.

that Pinpoint's system would have any possibility of working.[25] Pinpoint never responds to the points raised by Dr. Jackson in his Affidavit explaining the inherent infirmities in TDMA sharing. (Exhibit B to North American Teletrac and Location Technologies, Inc.'s Application for Freeze, filed May 21, 1993). In fact, these vague proposals, which Pinpoint now augments with an obviously unworkable proposal for frequency division sharing (id. at 36, n.53), are in no way responsive to Professor Pickholtz' analysis. (See Pickholtz Study at 27-45).

Pinpoint continues to claim that sharing is feasible with "robust systems" and that Teletrac is seeking exclusivity only to handicap more "efficient and compatible systems." (Pinpoint Comments at 11, 14-15, 28 and 30). Of course, these kinds of statements become increasingly less credible when one considers that Pinpoint recently conceded that Teletrac's service offers the best quality technology currently on the market.[26]

Pinpoint asserts that Teletrac designed its system to operate only in a "pristine environment" of much less than -100 dBm noise levels. (Id. at 27). According to Pinpoint, a practical system must be operating with noise levels of -90 to -80 dBm, an observation Professor Pickholtz agreed with. In fact, the Teletrac Study reported noise levels in the band in the

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[25] While Southwestern Bell uses the word "sharing" to support its entry claim, it also states, apparently without recognizing the inconsistency, that it must have co-channel separation once Southwestern gains entry.

[26] Telephone Week, April 12, 1993 (attached as Exhibit 1).

-95 to -85 dBm range. (Teletrac Comments Appendix 3 at 5). Teletrac has no quarrel with Pinpoint's assertion as to what a practical system should achieve. That is what Teletrac's system does achieve. As our Opening Comments demonstrate, Teletrac tested its receiver with a noise level at the -80 dBm level, and as the field test report shows, it works well. (Id. Appendix 2 at 16). Accordingly, accepting Pinpoint's logic, the Teletrac system meets Pinpoint's requirements for operating in this band and Teletrac's real world experience suggests sharing does not work.

Finally, just as Pinpoint's sharing proposals have changed, so has the description of the Pinpoint system itself. In its twenty Applications to build systems, Pinpoint claimed its base stations would have 484 watts E.R.P. (See, e.g., Pinpoint Communications, Inc. Application for Private Land Mobile Radio Services, FCC File No. 347483). Having apparently given the matter some more thought, and perhaps recognizing at least some of the consequences of the current RF environment, Pinpoint now suggests its base stations should be allowed to operate at 5000 watts E.R.P. (Pinpoint Comments at 29;[27] Figure 1). Pinpoint's ten-fold power increase shows that the "Tragedy of the Commons"

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[27] Not surprisingly, Amtech supports the Pinpoint proposal. Amtech Comments at 33.

has begun even before Pinpoint has deployed a single unit.[28] (See Teletrac Petition at 25-26 and n.40).

In essence, the reason for these high power levels is that Pinpoint plans a mobile data service rather than a location service.[29] To sanction sharing rules proposed by an entity that does not plan to primarily engage in LMS is a recipe for disaster. And, as we note below, adopting the Pinpoint proposals would create enormous difficulties for Part 15 service. (See p. 45-46, infra).

Southwestern Bell, unlike Pinpoint, expressly acknowledges that "[i]t must be anticipated that in a shared environment, even the most robust system can ultimately be overwhelmed by co-channel noise." (Southwestern Bell Comments at 12). Thus, Southwestern Bell adopts Teletrac's view that a "Tragedy of the Commons" will ensue as open entry creates the potential for "frequency chaos in large urban markets" and that a "shared environment will ultimately fail without some measure of exclusivity." (Id. at 13-14 & n.23). Southwestern Bell accordingly endorses co-channel separation of wideband systems.

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[28] Pinpoint's high power levels are also necessary, in Pinpoint's words, "to ensure that the mobiles will be able to receive the base signals while near to local-area system/jamming sources." Pinpoint Comments at 29. Apparently, part of the need for this power increase is an attempt to overcome interference from Amtech-like tag readers.

[29] For example, in a recent court-filed document, Pinpoint refers to itself as a "radio-location based mobile data network." Pinpoint Communications, Inc. v. Cue Network Corporation, SA 92-859 GLT (RWR) (C.D. Cal., filed Feb. 18, 1993), ¶ 6.

2. Southwestern Bell's Proposal for 4 MHz Systems Should be Rejected

Having agreed to co-channel separation, Southwestern Bell once more advances the argument that wideband allocations should be limited to 4 MHz each, although it contends its technology "can operate on 2 MHz in today's LMS environment."[30] (Id. at 12-13).

Of course, that position is absolutely devoid of analysis or support. Southwestern Bell carefully avoids describing its technology or the operation of its system. It offers no information whatsoever that would counter Teletrac's showing in its Opening Comments that a 4 MHz LMS system is unlikely to prove viable and to offer the benefits that the public should expect from LMS technology. (Teletrac Comments at 7-9, 23-24, Appendix 1 at 34; Appendix 3 at 32-34; Appendix 4).

Southwestern Bell also completely fails to address the severe loss of capacity that would result from limiting wideband pulse-ranging systems to 4 MHz. As Teletrac demonstrated in its Opening Comments, two 4 MHz systems each in the 904-912 and 918-926 MHz bands, as proposed by Southwestern Bell, would have a combined capacity of only one-half of a single 8 MHz system in each band. (Teletrac Comments at 37-38). MobileVision agrees with this analysis, (MobileVision Comments at 37) as, in

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[30] The Southwestern Bell notion that a null-to null bandwidth is equivalent to the occupied bandwidth is contrary to Commission rules. Compare Southwestern Bell Comments at 8 n.12 with 47 C.F.R. § 2.202(a). Accordingly, using generally accepted concepts, Southwestern Bell's proposed system occupies far more than 2 MHz.

substance, does Pinpoint.[31] Pinpoint has, in fact, stated that 8 MHz is the "minimum acceptable bandwidth for IVHS applications."

of measuring their bandwidths.[33] These equipment authorization procedures -- as the Commission's NPRM proposes -- are essential to achieving spectrally efficient, consumer oriented equipment.

Moreover, again because of the absence of an equipment authorization requirement, Teletrac uses transmit filters in its RLUs that are more conservative than might be necessary.[34] Thus, for example, if the Commission were to adopt the specific requirement of 47 C.F.R. 2.202(a) that 99% of the transmitter's power be contained within the bandwidth, then in future products we would modify our filters to spread the energy more evenly across the band and allow deployment of units with lower power as various customers have requested.

Thus, the 4 versus 8 debate is a red herring. Teletrac uses 4 MHz; it uses 8 MHz depending on the question being asked. It is clear, however, that in the wording of the interim rules, Teletrac requires 8 MHz to have the capacity to provide the panoply of services which wideband pulse-ranging systems can offer.

a. There is no economic justification for the Southwestern Bell proposal.

Southwestern Bell attempts to justify its proposal by claiming that two LMS licensees in each city is "not in the best

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[33] See, e.g., n.30, supra.

[34] The Teletrac signal would have an unfiltered bandwidth in excess of 10 MHz, using the bandwidth specification of 47 C.F.R. 2.202(a).

interest of the public."[35] Southwestern Bell has made no showing that LMS licensees will be able to exercise any market power if two are licensed in each city. Nor could it, as Teletrac's Opening Comments demonstrate.[36]

Other commenters in this proceeding have confirmed Teletrac's position that no "duopoly" or opportunity for the exercise of market power will result if two wideband LMS operators are licensed in each market. Part 15 users Knogo, VTech and HTS, for example, point out that

> There are numerous wireless alternatives in existence or under consideration which are almost certain to embrace these types of location and monitoring services. Mobile satellite services are being developed which will provide region[al] and nationwide radio location services, which may be adaptable to the types of localized offerings under consideration here. The capacity of cellular and SMR systems are being expanded with the use of digital technologies that will encourage a variety of non-voice applications -- including, presumably, location and monitoring services, utilizing both wideband and narrowband technologies operating in the 900 MHz band.
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> -- Comments of Knogo Corp., VTech Communications and HTS, at 8-9[37]

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[35] Southwestern Bell Comments at 14.

[36] Teletrac Comments at 16-18, 39-41 and Appendix 3 at 11.

[37] The Comments of Part 15 Coalition at 5, stated that there are a "multitude of location and messaging options available to the consumer in other services and other spectrum." The Coalition points to the proposed TRX Transtel System and to the planned deployment of Cellular Digital Packet Data (CDPD) technology as substitutes for LMS services provided by Teletrac. Id. at 14-15.

Southwestern Bell contradicts itself claiming on the one hand that 4 systems are needed, but then pointing to the "rapid and highly successful development and implementation of cellular service throughout the nation," with two carriers.[38] It is fair to conclude that Southwestern Bell has provided no justification

important public benefits that amply justify a separate allocation.[40]

Southwestern Bell's comments provide a clue as to its mysterious failure to describe its technology and the capabilities of its proposed LMS service in any detail.

licensed.[42] The Commission would risk the benefits of this technology if it were to accept Southwestern's position.

3. Teletrac Supports the Alternative FCC Proposal

In the NPRM, the FCC proposed an alternative suggestion to sharing among wideband systems. The alternative would provide co-channel separation to existing licensees for a period of five years. At the end of the five years, new licensees would have to "protect" the "initial licenses." Implicit in this proposal is that, during the five-year period, the initial licensees must have begun commercial operation of a system in order to retain the license.

As stated in our Opening Comments, Teletrac views this as a second-best alternative to complete co-channel separation. However, Teletrac is willing to support the proposal since it is better than sharing, which would provide no impetus for the growth of the LMS industry. Our Opening Comments at 46-47 included proposed detailed rules for implementing this approach.

II. THE "WIDE-AREA/LOCAL-AREA" DISTINCTION SUGGESTED BY SOME COMMENTERS IS UNWORKABLE AND UNNECESSARY

Teletrac has supported the Commission's distinction, both in its existing rules and the proposed rules, between wideband pulse-ranging vehicle location systems and other systems. (Teletrac Comments at 20-21). To make the distinction meaningful, Teletrac proposed, in its Opening Comments, a definition which states

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[42] Teletrac centers its signal at 908 MHz.

> A pulse-ranging system should be defined as a Location and Monitoring Service system that
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> a) transmits wideband pulses from a unit to be located and calculates location using time of arrival or differences in the time of arrival of the pulses at a number of fixed locations; or
>
> b) transmits wideband pulses from a number of fixed locations, and calculates location using time of arrival or differences in the time of arrival of the pulses at the unit to be located.
>
> -- Teletrac Comments at 10-11.

Several commenters have suggested that a "wide area - local area" distinction would be preferable. (See, e.g., Amtech Comments at 2 n.3, 19 n.37; Mark IV Comments at 6 n.2). Teletrac continues to believe that the appropriate regulatory distinction for spectrum management purposes is between wideband pulse-ranging systems and other systems (narrowband or non-pulse-ranging).

The Commission's proposal provides a workable allocation of spectrum (assuming that multiple wideband pulse-ranging systems are not licensed in the same band), and allows a separation between wideband pulse-ranging systems, which are defined in § 90.105 as proposed by Teletrac (Comments at 10), and narrowband or other systems not eligible for licensing in the wideband pulse-ranging segments. However, a regulatory separation between wide area and local area, though perhaps intuitive, is not rigorous and cannot easily be captured in a rule (absent, perhaps, detailed technical specifications). This is because a

radio signal intended to identify a vehicle ten feet away will actually propagate for miles.

It would appear that the intent of at least some parties who propose the wide area/local area distinction is not to simplify or improve regulation, but rather to seize on the inherent vagueness of such a distinction to open up the wideband pulse-ranging segments to their nonqualifying systems. Amtech, for example, cites a letter from its General Counsel claiming it is a pulse-ranging system. (Amtech Comments at 19 n.37). This letter has already been presented to the Commission, which has nonetheless correctly characterized Amtech's system as "narrowband." (NPRM ¶ 25). Amtech's argument would appear to be merely an attempt to take advantage of the difficulty in rigorously defining wide area and local area systems to circumvent the Commission's separation proposal.

III. THE FORWARD LINK SHOULD REMAIN WHERE CURRENTLY POSITIONED

Teletrac has supported the Commission's proposal to leave the forward links for wideband pulse-ranging systems where they are currently located. There has been no showing that the current forward link locations cause any interference or other problems, or that moving them to some other frequency will be workable.[43] Accordingly, maintaining the status quo is the best solution.

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[43] The forward link issue is thus wholly unlike the narrowband migration issue, where significant interference with existing operations has been shown.

Every commenter to address this issue, including wideband sharing proponent Pinpoint, agreed that some band should be identified for forward link operations. (See Comments cited at nn.45-50, infra). However, commenters were all over the lot as to where the links should be placed. The only common thread running through the proposals was that each would disrupt Teletrac's system by requiring Teletrac to move its forward link.

Pinpoint acknowledges that forward links cannot be shared and would constitute a "significant source of interference" for wideband pulse-ranging systems.[44] Pinpoint suggests that wideband pulse-ranging operators be required to use a link in the same channel as is used for location services. Amtech also suggests that wideband pulse-ranging forward links be moved to the edge of the 902-928 MHz band, or outside the band altogether.[45] Amtech concedes, however, that, "local area systems are not likely to be disturbed by the forward links."[46] Southwestern Bell suggests moving the links to the band edges, but this is where Southwestern Bell proposes moving Part 15 users

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[44] Pinpoint Comments at 21.

[45] Amtech Comments, at 31-32. Like Pinpoint, Amtech also suggests moving the links outside the bands, suggesting 901-02, 930-931 and 940-941 MHz frequencies or the use of paging and narrowband PCS channels.

[46] Id. at 31.

as well.[47] Moreover, amateur radio operators have asked that one of the band edges be protected.[48]

Finally, MobileVision now argues that the forward link for a particular system should be located in the 8 MHz band that MobileVision will use for location functions -- even though earlier MobileVision supported Teletrac's proposal.[49] MobileVision states this proposal is less costly, but offers no analysis of the desirability or cost of moving the forward links.

IV. PART 15 AND AMATEUR OPERATIONS ARE NOT A PART OF THIS PROCEEDING, AND PROVIDE NO REASON FOR THE COMMISSION TO DELAY OR DEFER ADOPTION OF PERMANENT LMS RULES

A. The Commission Has Already Made Clear That This Proceeding will Not Affect the Status of Part 15 or Amateur Operations under the Commission's Rules

This proceeding has generated a good deal of interest from parties who have or claim an interest in Part 15 and amateur operations.[51] This interest appears to stem from an error in the NPRM, which as originally issued, suggested the Commission might consider removing Part 15 users and amateur operations from the band or restricting their operations. (NPRM ¶ 24).[52] On May 5, 1993, an erratum was released correcting this reference to state that commenters "should offer potential solutions, short of removing Part 15 users and amateur operations from the band, restricting where such users could operate in the band, or placing stricter limitations on the operation of such users in the band."[53]

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[51] A review of Part 15 equipment authorizations suggest that not all of the parties filing as Part 15 interests actually produce Part 15 equipment at the present time; nor is it clear how many operate in the 902-928 MHz band. See p. 37, infra. For example, Proxim is a Part 15 commenter in this proceeding yet Proxim has announced that its second generation devices will operate in the 2.4-2.483 GHz band rather than 902-928 MHz PC. PC Week, June 28, 1993 at 57.

[52] The sentence at issue read: "If not, commenters should offer potential solutions, such as removing Part 15 users and amateur operators from the band . . . or placing stricter limitations on the operation of such users in this band." NPRM ¶ 24.

[53] DA 93-516, PR Docket No. 93-61, RM-8013, ¶ 3, released May 5, 1993 (emphasis supplied). 8 FCC Rcd 3233.

The NPRM, as corrected, makes clear that this proceeding is not intended to work any change in the status of amateur radio and Part 15 users in the 902-928 MHz band. By the same token, no reconsideration of the Commission's overall approach to Part 15 or amateur radio regulation is conceivably within the scope of the proceeding. The Commission has confirmed that this is a proceeding about LMS service, not about the regulatory scheme governing Part 15 and amateur radio users.

A large number of the comments from Part 15 and amateur radio parties appear in large part to be unaware of, or to ignore, the erratum.[54] Given that the Commission has affirmed that amateur radio and Part 15 devices will remain within the band, the concerns of these commenters have already been addressed. They provide no reason for the Commission to delay the implementation of final LMS rules.

Another group of commenters, primarily members of the Part 15 Coalition, have asked the Commission to use this proceeding to reevaluate the entire regulatory structure governing Part 15 and amateur radio users. The Part 15 Coalition seeks a "comprehensive review of all facets of the use of this band," including establishment of a formal technical committee to establish sharing arrangements for the band.[55] Several manufacturers of Part 15 devices are more explicit. They ask the

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[54] See, e.g., Comments of MetroVision, Inc. at ¶ 4; Comments of Telescan Systems, Inc. at 1; Comments of Howard W. Reynolds at 1.

[55] Comments of Part 15 Coalition at 12, 18.

Commission to "review and refine its policies toward Part 15 devices," and assert it "should no longer be the rule that licensed devices are protected and that the unlicensed products must give way when new radio services or allocations are considered."[56] Similarly, the American Radio Relay League identifies its ultimate goal as "consideration of elevation of the status of the Amateur Radio Service in the band to co-primary among non-government users."[57]

Perhaps the most extreme proposal for using this proceeding to effect a radical alteration in Part 15 regulation comes from Sensormatic Electronics. Sensormatic proposes that LMS services be authorized on "an equal, secondary basis with Part 15 users."[58] Alternatively, Sensormatic seeks to exclude all LMS services entirely from the entire sub-band between 902 and 920 MHz.[59] This proposal is, of course, completely inconsistent with 47 C.F.R. § 90.239, and twenty years of regulatory policy thereunder, and would render all of Teletrac's licenses invalid.[60]

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[56] Knogo Corp., et al., Comments at 12. Accord, Comments of Domestic Automation Co. at 12-13.

[57] Comments of the American Radio Relay League, Inc., at 10.

[58] Comments of Sensormatics Electronics Corp. at 25.

[59] Id. at 26.

[60] Sensormatic's extremism can also be seen in its argument that because the Commission agreed to delay authorization of new Part 15 devices for one year in the 902-905 MHz subband to protect its operations, Sensormatic now has the right to have all other users removed from that subband.

It also seems that several of the commenters who are seeking such an expansion of the scope of this rulemaking do not currently have a significant interest in the 902-928 band. Knogo Corp., for example, concedes that its devices have generally operated at 25 MHz and that it has only recently become interested in the 902-928 MHz band. (Knogo Corp. Comments at 2-3). The Part 15 Coalition provides (unsubstantiated) numbers purporting to show large investments by its member companies, but at least some of its members have no significant presence in the 902-928 MHz band. The Alarm Industry Communications Committee (AICC) similarly provides no disclosure of the extent to which the operations it describes are actually present in the 902-928 MHz band; most if not all garage door openers and security alarms operate at 300-450 MHz.

Elevating Part 15 and amateur users above secondary status to primary or co-primary status would be a very substantial policy change for the Commission, with implications extending far beyond the scope of this proceeding. Such a significant policy change, should the Commission desire to consider it, would

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Sensormatic Comments at 14-15. Sensormatic goes so far as to accuse the Commission of bad faith for not giving it virtually exclusive use of the sub-band! Id. at 16.

properly be made the subject of a separate rulemaking.[61] It has no place in this proceeding.

B. Contrary To The Misimpressions Of Some Commenters, Teletrac Has Not Proposed Substantial Increases To The Types Of LMS Services That Can Be Provided In The Band

Some commenters also express concern that the band will become overloaded should the FCC expand the permissible uses of LMS to include location of all types of objects, and individuals as well as to provide service to the federal government.[62] However, these commenters misunderstand the status quo. As noted in the NPRM, ¶ 5, Teletrac is already generally authorized by waiver to provide those services directly.

The rulemaking would simply ratify existing operations; it would not, in doing so, create some special new problem for Part 15 and amateur users of the band. The Part 15 Coalition states that "Part 15 applications have flourished under the existing

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[61] In fact, the Commission already has proposed, in its pending PCS proceeding, to allocate the 1910-1930 MHz band for Part 15 devices such as cordless telephones, wireless PBXs and wireless data networks. Amendment to the Commission's Rules to Establish New Personal Communications Services, 7 FCC Rcd 5676, 5692-94 (1992). Such unlicensed operations will be co-primary with existing Part 94 operations in the band, and Part 94 operations for which a license is filed after the date of the NPRM will have to accept interference from unlicensed PCS operations. Id. at 5693. Part 15 users can also choose to operate in the 2450 MHz band (for which Cylink, Western Multiplex, and others hold equipment authorizations) and 5800 MHz (for which Windata has received an authorization).

[62] See, e.g., Comments of Part 15 Coalition at 8 (referring to the proposal as a "radical expansion of the

rules."[63] If that is so, they should flourish as well under proposed rules which confirm existing operations and reduce the potential for interference between LMS systems.

Moreover, the NPRM at ¶ 9, contains safeguards which address the concerns of some commenters that LMS will turn into a pure messaging service.[64] Under the NPRM, messaging performed by LMS

902-928 MHz band for AVM operations since 1974, and the licenses it has granted are not "temporary" in any way.

C. There Is No Reason To Believe Any Significant Interference Will Exist Between LMS Operations And Part 15 And Amateur Users In The 902-928 MHz Band

Although several commenters have expressed a general fear that the Commission's proposal will lead to increased interference problems between LMS on the one hand and Part 15 and amateur users on the other, none have provided any basis for such concern.[67] A number of commenters have pointed out that there are no interference problems currently, and that existing LMS operators and Part 15 and amateur radio users of the band have been good neighbors.[68] The Radio Relay League points out further that the band is available to amateurs only in ITU region 2 (and has been available only since 1985);[69] in addition, amateur use is prohibited in large areas of Texas, New Mexico, Colorado and

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[67] For example, one commenter, Kent Brittan, has once again filed comments. This time, he does not claim to represent the Missile Group Old Crows. He raises largely the same points as in his earlier comments. Teletrac has already responded to Mr. Brittan.

[68] See, e.g., Comments of William J. Kaiser, at 1 ("The Amateur Service has shared the band with AVM in a most responsible and interference-free way."); Radio Relay League Comments at 10 ("Amateurs can and will continue to share the 902-928 MHz band without interference to the services which it must

Wyoming.[70] Hence little equipment has been developed in the band.

Those commenters who do suggest there will be interference between LMS systems and unlicensed users generally misunderstand Teletrac's system or err in their calculations of potential interference. Teletrac's Opening Comments explained that its system has been designed to operate with Part 15 devices in mind,

Contrary to the completely erroneous suppositions of several parties,[72] Teletrac's system works well even at very low levels of signal-to-noise ratio. Field tests of Teletrac's system, provided as Appendix 2 to Teletrac's Opening Comments, showed adequate performance at signal-to-noise ratios of -15 dB to -25 dB. The Teletrac system is well able to handle operations in a band shared with Part 15 users. Moreover, Teletrac employs 25 or more receive sites in each city, and each wideband pulse is typically received by 6 or more sites. This provides redundancy, so that the Teletrac system is not disabled in case of temporary interference into a receive site.

As to the possibility that LMS systems will interfere with Part 15 users, Teletrac is already operating in six cities, and there is no record of any unresolved interference problems.[73] Moreover, as the Chief of the Private Radio Branch has noted:

> Pactel's location response system uses a wide band pulse technology that spreads transmitted energy across several megahertz of bandwidth, thereby reducing the amount of energy-per-hertz and interference to other

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> -- D. Ash and A. Coon, R.F. Monolithics, Inc. "Superregenerative Receivers" in Wireless Design and Development June 1993 at 27

[72] TIA Comments at 4; AT&T Comments, Appendix A, at 2; Interdigital Comments at 5. Other parties make bald assertions that Teletrac's system is fragile, with no evidence whatsoever to back them up. See, e.g., Thomson Comments at 2 (relying on erroneous TIA analysis); Symbol Technologies Comments at 8 (relying on unattributed hearsay); AICC Comments at 7-8 (same).

[73] Itron/EnScan confirm that they can coexist with Teletrac's existing system. Itron/EnScan Comments at 3.